



LANL-developed system offers better, faster, safer decontamination of surfaces

January 6, 2021

Necessity often spurs invention, and that is precisely what led to the development of a novel decontamination system fully designed and tested at Los Alamos.

“The Los Alamos mission to produce 30 pits per year requires the removal of many enclosures and other equipment from the Plutonium Facility,” says Ben Karmioli of the Lab's Actinide Material Processing & Power group. “Prior to removal, these actinide-contaminated items must be decontaminated, but the usual process demands significant manual labor—increasing safety risks as well as waste generation, and it's not always successful.”

A new technology was needed, one that could decontaminate effectively while reducing waste generation and dose rates. The Los Alamos researchers developed an integrated electrochemical decontamination and etching system that employs a reusable cleaning solution of highly oxidizing ions. These ions dissolve tough actinide oxides as well as other metal alloys and oxides, leaving behind a decontaminated, etched surface that is ideal for coating adhesion. The researchers have tested nanoparticle-enhanced coatings on the decontaminated surfaces and found superior adhesion and protection. It's a technology with two-fold benefit: decontamination of surfaces and an opportunity to protect those same surfaces.

Currently, the project is seeking an industrial partner through the Feynman Center for Innovation to further the scale up and applications. This technology can be used to decontaminate containment tanks, enclosures, and parts in nuclear facilities or other industrial facilities either as regular maintenance or for decommissioning.

“The world of decontamination needs is vast. Because our technology uses a continuously regenerated super acid, it has the ability to clean many surfaces, while offering an efficient and recyclable solution,” Karmioli says.

The newest version of the metal decontamination technology will be available in late January. It will demonstrate one of the most critical elements of the technology: integration of techniques stemming from a variety of scientific disciplines. Chemistry expertise, engineering expertise, analytical techniques, and acoustic monitoring techniques are some of the many features of the system that come together to create this novel technology.

Funding and mission

The Integrated Electrochemical Decontamination and Etching System was initially funded by a LANL Laboratory Directed Research and Development award. The technology supports the Laboratory's Nuclear Deterrence mission area and the Complex Natural and Engineered Systems capability pillar.

References: "Integrated Electrochemical Decontamination and Etching System," [Feynman Center for Innovation Tech Snapshot](#). October 2020.

Provisional Patent: DOE Reference: S-133,812.000

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